

Claims

1. A carbon fiber-reinforced resin composite material produced by curing a composition comprising:

(A) an epoxy group-containing vinyl ester resin having,
5 in the molecule, 0.8 to 0.3 equivalent of epoxy group and 0.2 to 0.7 equivalent of an ethylenically unsaturated group,

(B) a radical-polymerizable monomer,

(C) a curing agent, and

(D) a carbon fiber impregnated with 0.5 to 5% by mass
10 of (d) a vinyl ester resin as a sizing agent, obtained by an addition reaction of an epoxy resin and an ethylenically unsaturated carboxylic acid.

2. A carbon fiber-reinforced resin composite material according to Claim 1, wherein the curing agent (C) comprises
15 an organic peroxide curing agent and a curing agent for epoxy resin.

3. A carbon fiber-reinforced resin composite material according to Claim 2, wherein the curing agent for epoxy resin is an imidazole.

20 4. A carbon fiber-reinforced resin composite material according to Claim 1, wherein the ethylenically unsaturated group possessed by the epoxy group-containing vinyl ester resin (A) is an acrylic acid residue or a methacrylic acid residue.

25 5. A carbon fiber-reinforced resin composite material according to Claim 1, which has a Tg of 150°C or higher.

6. A composition for production of carbon fiber-reinforced

resin composite material, comprising:

(A) an epoxy group-containing vinyl ester resin having, in the molecule, 0.8 to 0.3 equivalent of epoxy group and 0.2 to 0.7 equivalent of an ethylenically unsaturated group,

5 (B) a radical-polymerizable monomer,

(C) a curing agent, and

(D) a carbon fiber impregnated with 0.3 to 5% by mass of (d) a vinyl ester resin as a sizing agent, obtained by an addition reaction of an epoxy resin and an ethylenically
10 unsaturated carboxylic acid.

7. A composition for production of carbon fiber-reinforced resin composite material according to Claim 6, wherein the curing agent (C) comprises an organic peroxide curing agent and a curing agent for epoxy resin.

15 8. A composition for production of carbon fiber-reinforced resin composite material according to Claim 6, wherein the curing agent for epoxy resin is an imidazole.

9. A composition for production of carbon fiber-reinforced resin composite material according to Claim 6, wherein the
20 ethylenically unsaturated group possessed by the epoxy group-containing vinyl ester resin (A) is an acrylic acid residue or a methacrylic acid residue.

10. A composition for production of carbon fiber-reinforced resin composite material according to Claim 6, which
25 comprises:

the epoxy group-containing vinyl ester resin (A) in an amount of 100 parts by mass,

the radical-polymerizable monomer (B) in an amount of 10 to 50 parts by mass,

the organic peroxide contained in the curing agent (C), in an amount of 0.1 to 5 parts by mass relative to 100 parts by mass of the total of the components (A) and (B),

the curing agent for epoxy resin contained in the curing agent (C), in an amount of 0.1 to 5 parts by mass relative to 100 parts by mass of the total of the components (A) and (B),

the sizing agent in an amount of 0.3 to 5% by mass based on the carbon fiber (D) impregnated with the sizing agent, and

the carbon fiber (D) in an amount of 50 to 80% by mass based on the total mass of the composition for production of carbon fiber-reinforced resin composite material.

11. A process for producing a carbon fiber-reinforced resin composite material, which comprises kneading a resin mixture of (A) an epoxy group-containing vinyl ester resin having, in the molecule, 0.8 to 0.3 equivalent of epoxy group and 0.2 to 0.7 equivalent of an ethylenically unsaturated group, (B) a radical-polymerizable monomer and (C) a curing agent, with (D) a carbon fiber impregnated with 0.3 to 5% by mass of (d) a vinyl ester resin as a sizing agent, obtained by an addition reaction of an epoxy resin and an ethylenically unsaturated carboxylic acid.

12. A process for producing a pultrusion product, which comprises kneading a resin mixture of (A) an epoxy group-

containing vinyl ester resin having, in the molecule, 0.8 to 0.3 equivalent of epoxy group and 0.2 to 0.7 equivalent of an ethylenically unsaturated group, (B) a radical-polymerizable monomer and (C) a curing agent, with (D) a carbon fiber
5 impregnated with 0.3 to 5% by mass of (d) a vinyl ester resin as a sizing agent, obtained by an addition reaction of an epoxy resin and an ethylenically unsaturated carboxylic acid, to obtain a composition for production of carbon fiber-reinforced resin composite material and then subjecting the
10 composition for production of carbon fiber-reinforced resin composite material to pultrusion.